THE MYCOLOGICAL WORK OF MOSES ASHLEY CURTIS

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C. L. Shear and Neil E. Stevens

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C. L. SHEAR AND NEIL E. STEVENS

That America's first eminent mycologists were both clergymen, and both, though northern men by birth, became residents of North Carolina early in their careers is perhaps to be regarded as more than a coincidence (7, pp. 54). A century ago there were few professional botanists in this country and botanical work was carried on as an avocation by men of other callings, largely by physicians (13), and clergymen, while the state of North Carolina is unsurpassed in this country in the variety of its plant forms.

In the particulars cited, the life of Moses Ashley Curtis bears a strong resemblance to that of his great predecessor Lewis David de Schweinitz. In other aspects, however, they were strikingly different. Schweinitz was educated largely in Europe, began his botanical work there, and returned to Europe at least twice. At the age of forty-one, when his botanical work was well under way, he left the South and made his home in Pennsylvania. Curtis, on the other hand, was educated wholly in this country, appears never to have visited Europe, and spent most of his adult life in the Carolinas. His contact with foreign and most American botanists was chiefly through correspondence. The writers have already presented the available data on the life and work of Schweinitz (18), in the belief that the interpretation of his work by present day botanists would be thus facilitated. With a similar purpose, they have collected in the present paper such facts as are available regarding Curtis' mycological work.

The most complete sketch of the life of Moses Ashley Curtis is that published by Dr. Thomas F. Wood (21) who was a personal friend of Curtis. This contains a good portrait. Briefer sketches, one by Dudley (7), one by Scribner (17), and an unsigned one in Popular Science Monthly (22), probably written

by W. J. Youmans, then editor of that journal, are based largely on Wood's paper. An appreciation of Curtis' work, and outline of his activities by Asa Gray (11), which was originally published in the Proceedings of the American Academy of Arts and Sciences, was reprinted with only a slight verbal change in the American Journal of Science and later in the scientific papers of Asa Gray. In addition to the publications mentioned and others which will be cited, the writers have obtained considerable information from other sources.

By far the most important source of information regarding Curtis, to which the writers have had access, is the correspondence of the late Prof. Edward Tuckerman, Jr., of Amherst, Mass. This correspondence, fortunately preserved almost complete, and now the property of Tuckerman's nephew, Judge E. T. Esty, of Worcester, Mass., to whom the writers are greatly indebted for permission to use the material here presented, forms an exceptionally valuable source of information regarding the botanists of that time. The correspondence between Tuckerman and Curtis began about 1839 and extended to 1867. A packet of letters written by Curtis to E. C. Howe, of New York, covering the period 1866 to 1870, was kindly loaned to the writers by Mr. Stewart H. Burnham, of Hudson Falls, N. Y. Several letters from Curtis are in the collection of the Academy of Natural Sciences of Philadelphia, for the use of which the writers are indebted to the secretary, Dr. Edward J. Nolan. In addition to those above mentioned, the writers have been furnished valuable information by Prof. Elmer A. Green, Registrar of Williams College, Curtis' son, the Rev. Charles J. Curtis, of Accokeek, Maryland, and Dr. W. G. Farlow, of Harvard University.

SKETCH OF CURTIS' LIFE

Moses Ashley Curtis was born May 11, 1808, at Stockbridge, Mass. His father was the Rev. Jared Curtis, then of Stockbridge but later, for many years chaplain of the State prison at Charlestown.[1] His mother was a daughter of Gen. Moses Ashley. He

[1] The reference to Curtis having been born in Charlestown, found in The Letters of Asa Gray (12, Vol. 2, p. 652, footnote), is evidently a mistake, due to the fact that his father was for a long time a resident of that city.

prepared for Williams College largely under the tuition of his father, who kept a school in Stockbridge.[2] Curtis' cousin, Mark Hopkins,[3] also received a part of his early training from Jared Curtis.

Curtis graduated from Williams College in 1827. Three years afterward (October, 1830, 21, p. 10) he went to Wilmington, N. C., as tutor in the family of Governor Dudley. In 1833 (21, p. 15), he returned to Charlestown, Mass., for a year and a half, where he prepared his first botanical paper and began his studies for the ministry. He married Miss Mary de Rosset of Wilmington, December 3, 1834, and was ordained in the Episcopal Church in 1835, and at once took up missionary work in western North Carolina, with headquarters at Lincolnton. From early in 1837 to May, 1839, he was engaged as a teacher in the Episcopal School at Raleigh. The summer of 1839 was spent in the mountain country largely for his health, but that he used this time to good botanical purpose is evidenced by the testimony of Asa Gray (10, p. 12), that "no living botanist is so well acquainted with the vegetation of the Southern Alleghany Mountains . . . as the Reverend M. A. Curtis." Early in 1840 (21, p. 16) he was called to mission work about Washington, N. C., and early in 1841, removed to Hillsboro. Here, with the exception of nine years (1847–1856) spent at Society Hill, South Carolina, he resided until his death in 1872.

EARLY BOTANICAL WORK

Both Gray (11) and Dudley (7) note that Curtis' attention must have been early directed to botany, and in the letter transmitting the manuscript of his "Woody Plants of North Carolina" (5) to Dr. Ebenezer Emmons, then state geologist, Curtis writes as follows (5, p. 6):

> "I will state in conclusion, what you were not before aware of, that this Report is one of the fruits of your long continued service in the field of Science. My first knowledge of the elementary forms of Botany was derived from

[2] Information in a personal letter from Rev. Charles J. Curtis.

[3] Born at Stockbridge, Mass., February 4, 1802, eldest son of Archibald Hopkins and Mary Curtis.

yourself and your distinguished Preceptor, Prof. Eaton, at the beginning of your public career. Though I was then too young to be admitted to your course of instruction, an impulse was then given which never abated, and now, forty years afterward, returns back to you with this humble offering. The contribution is, therefore, most appropriately put in your hands by

Your friend and servant,
M. A. CURTIS."

The significance of this reference is apparent when it is recalled that in 1817 Amos Eaton (8) after two years at Yale chiefly under the tuition of Silliman, returned to Williams College, from which he had graduated in 1799, and there offered courses in geology and botany. As far as the writers have been able to determine, Eaton was not a member of the faculty, but with the enthusiastic approval of the faculty gave his courses to such students as chose to take them and among these students was Emmons.

Encouraged by the success of his work at Williams, Eaton gave courses of popular lectures on botany at various places in New England and New York. Prof. A. Hopkins (brother of Mark Hopkins) gives a striking description of Eaton[4] and his methods and refers to the fact that his "young pupil Emmons" was employed to collect plants for the demonstrations which accompanied the lectures. It is highly probable that the lecture so vividly described by Hopkins was delivered in his home town of Stockbridge and that Curtis, then nine years of age, may have attended the lecture. "The course of Instruction," to which Curtis refers, may have been that given in the nearby Lenox Academy in the spring of 1819 (8, p. 361). At any rate, as his own letter testifies, Curtis received his earliest botanical inspiration from the vigorous popular lecturer who had earlier encouraged Torrey (13, p. 136), and whose "Manual of Botany" was Asa Gray's first botanical text.

[4] Durfee (8, p. 360) gives a good biographical notice of Amos Eaton, which is copied by Nason (16) and used as a basis of the sketch published in Popular Science Monthly. There is also a good life of Eaton by Harlan H. Ballard in Collections of the Berkshire Historical and Scientific Society, pp. 185–234, 1897, and a sketch of his geological work in Merrill (15).

Curtis' first botanical paper was "Enumeration of Plants Growing Spontaneously Around Wilmington, North Carolina, with Remarks on Some New and Obscure Species." In this paper, which was prepared after only two years' residence in North Carolina, the author's powers of observation and aptitude for research are, according to Gray (11, p. 472), well shown. It is probable that much of Curtis' time while in college and during the three years succeeding his graduation, about which we have no record, was spent in botanical exploration in the Berkshires.

MYCOLOGICAL WORK

While Curtis never lost his interest in flowering plants, it was in mycology that his most notable work was done and it is as a mycologist that he is chiefly known. That Curtis was early interested in cryptogams and in touch with the literature on the subject is evidenced by his first letter to Tuckerman:

RALEIGH, N. C.
Feb. 18th, 1839.

Dear Sir:—

I was much gratified this day by the rec't of your "Enumeration of some Lichenes of N. England". Accept my thanks for your favor with an assurance that I am much pleased with every attempt to elucidate the Cryptogamia of our country . . . I am the more interested in your attempt because I hope to receive some advantage from it when I come to take up that order more systematically than I have yet done. I have hitherto worked upon it very unsatisfactorily and much at random, for want of suitable help. The libraries of this State afford me no encouragement and I cannot supply myself with books. I repeat then, that I hope you will go on in your effort.

. . . . . .

I think you would find much scope for interesting investigation among the Algae and Hepatic Mosses. The latter have received considerable attention from Schweinitz but the former have been entirely neglected as far as I know. (I can send you a copy of Schweinitz's Hepaticae if you do not own it.)

According to Wood, Curtis was in correspondence with Torrey as early as 1833 (21, p. 15) and met Ravenel in 1835. By 1840 he was carrying on a correspondence and exchange of specimens with Darlington and others and had accumulated an herbarium.[5] His correspondence was, however, confined to America,[6] and even late as 1844 his letters are devoted chiefly to phanerogams.

In 1845 Tuckerman seems to have given definite stimulus to Curtis' interest in cryptogams by requesting his assistance in collecting lichens, to which Curtis replies enthusiastically as follows:

HILLSBOROUGH, N. C., Nov. 7, 45.

Dear Sir:

Your letter reached me today, and I give an early answer as you desire. Your request, particularly when I consider the ground & purpose of it, has certainly my "sympathy", but I cannot now say how much you may expect from my "cooperation". I have several times thought I would take up the Lichens, & once made a small collection in the Low Country of this State, but the difficulty of studying *without* books embarrassed my progress & damped my zeal pretty effectually. Consequently I have now little on hand.

I am desirous of seeing a *complete* N. A. Flora, & am therefore glad that your attention is directed to a department which, if left to Torrey or Gray, would, I suppose, get a go-by. And I am willing to do what I can to help you on in the work, but my ability will not perhaps go to the extent of your wishes & need. I am at present in a region not abundant in interesting vegetable forms. It is probably in the swamps of the low country that peculiar forms of Lichens would be found, where the soil, climate, & elevation, are so different from the N. States. The middle region of the South is not so much unlike the North, & has much more of the Northern Flora. Besides, my present habitat has the precise features of that occupied by Schweinitz, when a resident of this State. It is not likely therefore that I should procure anything here which he has not already furnished Fries with. Nevertheless, I am disposed to try, & if leisure & health permit I will endeavor to collect something this winter for you. Without practice in this line, & with hardly any knowledge of species, it is not unlikely that I shall

[5] Letter to Tuckerman dated Portsmouth, N. C., Sept. 7, 1840.

[6] Letter to Tuckerman dated Washington, N. C., Feb. 11, 1841.

overlook many things, or perhaps even mistake a diseased excrescence for a Lichen.

Only eight days later he writes Tuckerman again.

Hillsborough, N. C., Nov. 15th /45

Dear Sir:

You will hardly expect from my last letter that I should commence work in your service so promptly as this. Nevertheless, I have nearly every day since been making some accumulations. What with my wood-pile, & the trees and old rails & posts on my premises, I have already got a small box full of specimens of something. Today I have taken a walk to some small wooded heights in the vicinity, here honored with the name of mountains, where I observed much more than I could bring home, upon the Trees, Rocks, & Earth.

I am met at the outset with what may be a serious annoyance to you. As I do not know a single species with certainty, & my ignorance is a hindrance to memory, I cannot tell at any time what I may have gathered before. And thus I may possibly send you scores of specimens, & not a score of species. I am also afraid to make a comparison of specimens from different localities & different species of trees for the purpose of throwing out a redundance of duplicates, for fear that I might overlook some slight differences which in your eye would be of essential interest, I find I need some training in order to serve you efficiently. To this end, it occurs to me that after all I had better have a set from you as a guide. By some study of it, I could in a little while get some general knowledge of Genera, & learn some of the distinctions of species. This would give important practice to the eye. From your letter to me, I judge that you have sets to spare. If therefore you will let me have one, as complete as you can spare, even as a *loan,* it will facilitate my progress very much, & probably save you the trouble of examining much trash.

I observe on the rocks—of which there is no lack here any more than in the country about Boston—many peculiar & pretty forms of crustaceous Lichens which I can devise no means of obtaining. What is the process? Let me know about this; & if they can be got off you shall have some.

I wish to see your specimens also, in order to know what sort of things to make. I have thus far chipped from trees small bits & strips of bark which do not include the whole thallus, though I intend they shall always show its margin.

Specimens from you will be of service in this respect. Suppose I send you a few in a pamphlet? I could send in this way large quantities, if you will endure the postage on them. —Shall I send a box for you at once?—& risk the wintry sea between Petersburg & N. York? Or, shall I wait till Spring and send a larger collection?

It is not unlikely that this work will excite sufficient interest in the subject to induce a desire of having a collection of Lichens; & possibly of making them a study. If so, I shall desire that a specimen of whatever I send you may be returned with a name. But of this more hereafter.

Respectfully,
M. A. CURTIS.

A month later he refers to an earlier attempt to study lichens, letter dated Hillsborough, N. C., Dec. 16th/45.

Every load of wood is overhauled as it comes to my yard, & no stick goes upon my fire that is not faithfully examined. I think I must have five or six hundred or more species, & representing twenty or more genera.

. . . . . .

Some years ago, when I started in this direction I was met by the same difficulty, & quit in despair, sending a part of my collection to Torrey (which I presume he threw away), & neglecting most of the remainder, I started at that time with some earnestness, &, if I could have then had a little assistance from a good Lichenist & some books, I should have been by this time somewhat au fait in this department.

My zeal in reviving again somewhat, & if I receive sufficient aid & encouragement from you, I shall probably go on with some vigor.

. . . . . .

Whenever good specimens of Fungi have presented themselves in my search for Lichens, I have enclosed some for Fries.

. . . . . .

I hope you will work up the N. A. Lichens. Just give me prestige enough, & I will see that those of Carolina are looked after. Furnish the stimulus, & I shall keep going, I reckon. My hands are sore cutting off bark,—blistered and torn.

Truly yours,
M. A. CURTIS.

A letter written January 8, 1846, shows that shipping specimens by freight proved too slow for Curtis' growing impatience and contains his first reference to a serious study of fungi, to which he has already given some attention.

HILLSBOROUGH, N. C. Jan: 8th/46

Dear Sir:

You solicited my assistance in collecting Lichens with a fear, no doubt, that I might decline the service on account of being too troublesome to me. There is now some danger that the most trouble will be in the other direction. I am getting impatient to know some of these Lichens—all of them indeed—but I can be kept somewhat comfortable by learning a few at a time. There will be progress—& that is what I wish to realize. With your permission then, I will occasionally, till my box reaches you, send a few specimens by letter that you may give me the names. I will not trouble you to write letters in reply, but merely to send a sheet containing the names of the plants, if you can do it without too much labor or annoyance.

. . . . . .

I have taken out from the collection such Fungi as I could readily lay hands on. Some probably remain, which you can throw into the fire. But I will be obliged to you to communicate my proposal to Fries. I shall be glad to know something of this Order. How can I get a copy of Schweinitz Synopsis Fungorum?

I have several times attempted the Fungi, but with small means have made small progress. The Musci (frondosi) hurt my eyes too much, & I quit them long ago. But the Musci Hepatici I still dabble at. Can you send me any of these?

At this time (1846) it was evidently his plan to depend upon Fries for assistance in the identification of fungi.[7]

On April 27, 1846, he states that he has secured copies of Schweinitz's "Synopsis N. C. Fungi," and also the "U. S. Fungi."

There is a break of over a year in the correspondence between Tuckerman and Curtis (1846–1847). During this time Curtis began correspondence with Rev. M. J. Berkeley which effectively

[7] Letters to Tuckerman dated Hillsborough, N. C., April 13, /46, and April 27, /46.

fixed his attention on fungi. Early in 1848, he writes Tuckerman as follows:

SOCIETY HILL, S. CAR., Jan: 17th 1848

Dear Sir:

Yours of the 3d inst: reached me today, forwarded from Hillsborough, N. Car;—I removed here last April.

Since I last heard from you I have devoted my researches chiefly to Fungi—though I do not neglect the Lichens. For some time I continued to collect the latter very vigorously, but gradually became more fond of the former, until they have come to absorb pretty much all my attention.

That his study of fungi had been productive is evidenced by the publication in November, 1848, of his first mycological paper. In the introduction to this paper, Curtis gives a résumé of early mycological work in America and concludes as follows (4, p. 351):

At present I do not know that any American botanist is giving this obscure but interesting order any special attention, except H. W. Ravenal, Esq., of South Carolina, and myself.

In the present paper are enumerated two decades of Fungi not before included in any American publication, and one of new species. They are taken at random from lists of several hundred, which will be published from time to time hereafter. To acknowledge a heavy debt of obligation, and to insure to the following list an authority which I could not myself give it, I must here state that nearly all the species have passed under the eye of my very attentive and generous correspondent, Mr. Berkeley.

JOINT WORK WITH BERKELEY

The collaboration of Berkeley and Curtis to which the paragraphs just quoted are the first published reference, was not only profitable to both correspondents concerned but most advantageous to the progress of mycology, especially in America. That Curtis transmitted to Berkeley not only his own collections but fungi sent him by various American correspondents, notably, Ravenel, Michener, Peters, Sprague, Wright, Murray, Russell, Blake, Morse, and Sartwell, is evident from published references

(1). Some idea of the extent of Curtis' work is gained from the sentence with which Berkeley concludes the introductory paragraph to the first of the series of "Notices of North American Fungi," which appeared in Grevillea (1, p. 33).

> "Cyphers following the descriptive characters are those of an enormous mass of Fungi amounting to more than 6,000 numbers forwarded to me from time to time by the late Doctor Curtis."

Berkeley's letters sent to Curtis have been lost or destroyed, since according to the Curtis heirs, none are to be found among his correspondence and Dr. Farlow informs the writers that they are not with the Curtis collection of fungi at Harvard. The Berkeley correspondence which is in the British Museum contains, however, many letters from Curtis, the first of which, according to information kindly furnished by Miss Elsie M. Wakefield of the Royal Botanic Gardens, Kew, is dated April 17, 1846, and the last, March 12, 1872. With Berkeley's Herbarium at Kew are two small volumes containing the manuscript lists with notes and comments on the Carolina fungi[8] which Curtis sent to Berkeley with the specimens. A copy of this manuscript is in the library of the New York Botanical Garden. With the Curtis collections at Harvard are lists of several thousand numbers of the specimens sent to Berkeley with the corresponding numbers of the original collections. These are apparently copies which Curtis kept for his own reference.

To publish a complete bibliography of Berkeley and Curtis' work would be needless duplication of the excellent list given by Farlow and Trelease (9). It should be noted, however, that the series of papers under the title of "North American Fungi," beginning in 1872, were published by Mr. Berkeley after Curtis' death. These contained many species attributed to Berkeley and Curtis, based in part on manuscript notes furnished by Curtis with the collections. This series alone lists 1,005 species of American fungi. Curtis' contribution to this joint work was much more than that of a mere collection, as is plainly evidenced by the fact that the specimens he sent Berkeley were accompanied by

[8] Personal letter from Miss Wakefield dated Nov. 5, 1916.

manuscript lists of the specimens sent, together with notes and comments. It is therefore appropriate that even after Curtis' death, Berkeley published many of the new species under their joint authorship.

STUDY OF THE SCHWEINITZ COLLECTION

Perhaps the most important single piece of work undertaken jointly by Berkeley and Curtis was their study of the Schweinitz collection of fungi. Through the courtesy of Miss E. M. Wakefield in examining Curtis' letters to Berkeley now preserved at the British Museum, the writers were able to publish some account (18, p. 334–7) of the way in which this work was done. From this, it appears that Curtis spent 17 days, during the summer of 1851, in the study of the fungi in the Schweinitz Herbarium. There is a letter to Tuckerman dated "Phila. July 22nd, '51," which may very probably have been written during the time Curtis was engaged in this work. On the promise, apparently, of additional specimens for the herbarium (19, p. 555), (18, p. 335) and of "a critical review of the fungi" (18, p. 336), he was permitted to take a specimen from the collection when there were more than two of any species. Whenever the fragment which he took from the Schweinitz herbarium was large enough he divided it and sent a part to Berkeley, also in some cases a portion to Fries. Curtis was thus able to send to Berkeley nearly fifteen hundred specimens to keep, and later over three hundred which were to be returned when done with, as they could not be divided.

Of the promised "critical review" only one installment was published, this appeared in July, 1856, when as stated in the introduction "about one fourth of the species" had been reviewed. Much more of the material must have been critically examined later, however, as in Berkeley's personal copy of Schweinitz "Synopsis Fungorum in America Boreali" now in the library of the U. S. Department of Agriculture (see 18, p. 338) species are checked and sketches of spores occur throughout the book. Dr. Farlow writes in a personal letter dated Nov. 18, 1917, that in Curtis' copy of Schweinitz work, now in his possession, many of

the species are checked, evidently with the intention of indicating whether or not Curtis actually saw the specimens in the Schweinitz herbarium.

Regarding the preparation of the joint paper referred to above, the writers have found no correspondence. There are however in the files of the Philadelphia Academy of Natural Sciences several letters from Curtis which indicate that he prepared the material for the press, and corrected the proof. Portions of these letters which were probably written to Dr. Zantzinger, then secretary of the Academy and which are self explanatory, are published below.

SOCIETY HILL, S. CAR. Jan: 17th, '53.

Dear Sir:

There is now nearly ready a paper upon the Exotic Fungi of Herb. Schwein: which he never published. Mr. Berkeley thought it best to begin with these, as being material mostly new. The notice of his American species will follow in time, as we can reduce the materials. The task is more difficult than I had anticipated.

. . . . . .

Please inform me then, *when* you will be ready to publish this paper;—whether in quarto or octavo size;—& in regard to proofs, whether you allow us any copies, & how many.

SOCIETY HILL, S. CAR. Feb. 1st, 1853.

Dear Sir:

Your favor is received.—The paper on the Schweinitzian Fungi is not quite completed, but I hope to be able to forward it in four or five days.—In the meantime I send you the drawings by Mr. Berkeley sufficient for one Plate. It is doubtful if I shall have enough for another Plate. If not, there will be no more sent.

. . . . . .

I will be obliged to you for proofs of the Plate and Letter Press.—Your allowance of 20 copies to the Author is very liberal, & we will be obliged to you for them.—Please have 10 sent to me, & retain the others until I learn what disposition Mr. Berkeley will have me make of it.

With many thanks for your uniform courtesy, I remain, dear sir,

Very respectfully & truly yours,

M. A. CURTIS.

[This letter was addressed on the back to Dr. Zantzinger.]

SOCIETY HILL, S. C., Feb. 4th, 1853.

Dear Sir:

I herewith send manuscript.—The hand is a very awkward and puerile one, but printers have generally thought it very legible. So I hope there will not be much trouble about correcting proofs.

I should like to have the names, immediately attached to each Number, in other words, each species named & described, to be printed in small caps or italics. I prefer the former. I leave this however to your judgment, & so have not underscored said names.

I ought to have suggested in my last, that the figures engraved should correspond in size with the drawings sent, though I hope your artist has already thought of that.—The explanation of figures on the last page of MSS now sent will show the reason of this.

I shall be glad to hear of the safe arrival of this, and the Drawings sent on the 1st inst.

Very truly yours,
M. A. CURTIS.

SOCIETY HILL, S. C., Feb. 21st, 1853.

Dear Sir:

I have your favor of the 15th, & am glad to learn that my two envois arrived safely.

I do not like to put my inferior drawings upon the same plate with Mr. Berkeley's, & I have not enough to make another Plate. I have therefore concluded not to send any.

Please remember to send me proofs, & much oblige,

Yours very truly,
M. A. CURTIS.

SOCIETY HILL, S. C. Apr. 5th, '53

Dear Sir:

By last mail I returned proofs of the 2nd instalment of the "Exotic Fungi."—If in altering the *Plate* (a matter about which I have no knowledge) there be much trouble, the slight correction of fig: 3, a, might be left unnoticed, as it is a matter of no great importance.—The correction in the names at the bottom of the page should be attended to.

. . . . . .

Very respectfully,
M. A. CURTIS.

P. S. Could Dr. Leidy send me by *Letter* specimens of some of the Microscopic Fungi observed by him on animal tissues? I should like to examine them.

SOCIETY HILL, S. CAR Apr. 16th, '53.

Dear Sir,

. . . . . .

Can you add the following note to our Article

Since the Article on Exotic Fungi was put to press it has been ascertained that Gnadenhutte is in Ohio; & that Bishop Hueffel, while visiting the Moravian Missions on the Danish W. India Islands in 1827, collected many plants.

This note can be altered to suit your taste, if you do not like the cut of it.

. . . . . .

Very respectfully,

M. A. CURTIS.

The footnote mentioned in this letter is to be found at the bottom of page 293 of the paper as published in the bound volume. It also occurs in the authors' separates which are dated April, 1853, instead of March as stated in the introduction to the volume, page 4.

While engaged in studying the fungi in the Schweinitz herbarium, Curtis urged Tuckerman to undertake a study of the lichens, advice which Tuckerman considered worth acting upon as is evidenced by his published works (18, p. 341).

Letter to Tuckerman.

SOCIETY HILL, S. C. March 4th '53.

. . . . . .

I am engaged with Mr. Berkeley in a critical review of the Fungi of Herb. Schwein. our paper (upon the exotic species) to appear probably in next No. of Trans. Philad. Acad.

Would you not serve a good end by a similar review of the Lichens of that collection?

. . . . . .

FLORA OF NORTH CAROLINA

That Curtis' interest in fungi never entirely replaced his interest in other plants is evidenced by his publication, as a part of the Geological and Natural History Survey of North Carolina, of

a catalogue of the plants of his adopted state. This was published in two parts, the first (5), a popular account of the trees, and shrubs, was issued in 1860, and the other, a catalogue of all the plants of the State, in 1867. The second portion was apparently nearly ready for the press when the Civil War broke out, but from letters to Tuckerman dated February 5, 1866, and February 23, 1866, it appears that some of the material was revised after the war. An account of some of the difficulties he encountered in securing publication after the war has been presented elsewhere (19). That it was published at all under such circumstances is evidence of the author's enthusiasm and persistence. As might be expected in a list of plants prepared by Curtis, the cryptogams find a larger place than was usual at that time. As acknowledged in the preface, the Musci and Hepaticae were identified by Sullivant, the Lichens by Tuckerman, while the fungi, probably all passed through Berkeley's hands.

Upon Emmons, the state geologist, who like Curtis was a native of Massachusetts but a resident of North Carolina for several years, the Civil War seems to have produced a profound and painful impression. He writes Marcou (14, p. 15): "I cannot but look with great fear upon the results of agitation. It unfits me for work." Whether or not Curtis shared this feeling can only be surmised. In Curtis' letters to Tuckerman, there is no hint of his personal attitude or opinions regarding the war. In his letter to Governor Jonathan Worth (6, p. 3), transmitting for publication that portion of his flora which had been delayed by the Civil War, Curtis refers to the delay as due to "more important matters of national interest that were then occupying the public mind."

The shortage of food in the south during the war (20 and 21) turned Curtis' attention to an intensive study of edible fungi. His success in securing food in this way induced him to prepare an illustrated manual of edible mushrooms designed for popular use, the manuscripts and plates of which were evidently finished with the assistance of his son, Rev. Charles J. Curtis, some time during the year 1865. The enormous cost of publishing such a work, especially in the decade immediately following the Civil War prevented its publication. This manuscript is still in the possession of the family.

LATER WORK

That Curtis' botanical work after the Civil War was materially hindered by the condition of his health is apparent from his letters. As early as 1866, he writes:[9]

> "Nos. 4 and 5 would require an amount of eye-work, for a satisfactory determination, which my present health will not permit. So I must leave them for better times."

This by no means indicates that he had lost any of his enthusiasm or interest in mycology. His letters at this time to Howe are full of instructions for collecting fungi and suggestions for their study, and are sometimes illustrated by sketches of spores and asci. On Feb. 7, 1867, he writes Howe:

> "Never mind about repeating the same things. Send anything that comes to hand. Your fire-wood will furnish much material during Winter, both in Lichens and Fungi."

On April 17, 1868, after a break of about three or four months in the correspondence with Howe, he writes:

> "I am still ready, if you desire it, to aid you, so far as I can, in working up the fungi of your region of country.
> "Since your last package was reported, I have determined several hundred species for C. F. Austin."

In July, 1868, he speaks of a contemplated trip for his health.[10]

> "I expect to leave home shortly for the Cumberland Mts. in Tenn. I hope a few weeks' relaxation will restore me to customary. If not, I shall have to relinquish microscopy."

The trip was partly successful and on November 20, 1868, he writes him again:

> "My health is improving, & I will work away at your Fungi, so far as I can without a resort to the Microscope;—a little at a time."

[9] Letter to E. C. Howe, dated Hillsborough, N. Car: Nov. 12, 1866.
[10] Letter to Howe dated Hillsborough, N. C., July 14th, 1868.

DISTRIBUTION OF CURTIS' SPECIMENS OF FUNGI

Berkeley was of course Curtis' most constant and most valued mycological correspondent and collaborator and to him duplicates of most of his collections of fungi as well as those from Michener,[11] Ravenel and others were sent. These are preserved in the herbarium of the Royal Botanic Garden, Kew, together with Curtis' manuscript lists, with his notes and comments of the fungi he sent to Berkeley. As suggested in the letters to Tuckerman printed above, and in letters to Berkeley published earlier (18, p. 335), Curtis sent many of his own collections as well as some duplicates of the fragments he took from the Schweinitz herbarium to Fries; all these are at Upsala. Among the American correspondents to whom Curtis sent specimens in exchange, Ravenel and Michener are known to have received large numbers of fungi. His correspondence with Ravenel began early (about 1835?) and continued until Curtis' death. In 1868, he wrote as follows concerning their relations:[12]

> "P. S. I enclose a few specimens lately sent for determination from Mr. Ravenel of S. C. He has a prior claim over all others, & the examination of his specimens has interfered somewhat with that of yours."

Ravenel's herbarium is now in the British Museum, and Michener's in the Pathological and Mycological Collections of the United States Department of Agriculture (19, p. 556). In 1857 Curtis presented to the Philadelphia Academy of Natural Sciences a collection of nearly eight hundred species of fungi. These were mounted by Doctor Michener (19, p. 555).

About two years before his death, which occurred on the 10th of April, 1872, Curtis determined to dispose of his duplicate specimens of fungi. Concerning this matter he writes Howe as follows:

[11] Curtis correspondence and exchange of fungi with Michener evidently began some time before 1855. Some fragments of it have already been published by the writers (18, pp. 548–49).

[12] Letter from Curtis to Howe dated Hillsborough, N. C., May 29, 1868.

HILLSBOROUGH, N. C. March 22/70.

Dear Sir:

I do not know whether or not I have mentioned my wretched state of health for a few months past. I have suffered dreadfully during the Winter with Neuralgia in my heart. For a few days I feel much better and hope I shall be myself again ere long.

It has lately occurred to me that perhaps I might dispose of my spare Fungi to some advantage to myself, & others. I have a large stock of duplicate specimens, which I would be glad to be rid of. It will be no small trouble to put them up, but if I can be properly remunerated I will undertake the labor.

Now do you know of any individual, or of any club or society, that will give me Fifty Dollars for a collection of Fungi that will be third in America as to quantity and value? My own is first, Schweinitz (in Acad. Nat. Sc. Phil[ae].) second.

I will guarantee 1500 species. There may be 2000 or more. I will not increase my price if there be more than 1500. I will diminish the price (in proportion) if there be less.

The collection will be particularly valuable, as being composed very largely of *authenticated* species, both of European & American authors.

As I am well advanced in life & not likely to do much more active service in Mycology, I would be glad to have my stock of specimens disposed of to best advantage before I quit the stage. It will be a tedious job, requiring months of time, to put up such specimens as I have; but I desire that they shall get into proper hands, where they may be useful & of standard authority, instead of being scattered here & there, or possibly lost entirely.

Let me know about this, if you think it likely my stock will be wanted.

I have lately come upon specimens of Corynites brevis, B & C, which will be of use to you if you get hold of that plant of which you sent me a sketch. I made no record of the thing, & forget what I called it, but believe it was C. brevis. (Of all your *numbered* specimens I keep a list.) I should be very glad to get specimens of your N. York species. Do try to get some this year.

Yours truly,

M. A. CURTIS.

How many of the sets of fungi were prepared is not known, but one appears to have been purchased by Peck and another by Bessey, whose herbaria are respectively in the New York State Museum at Albany and in the herbarium of the University of Nebraska at Lincoln.

After Curtis' death his own herbarium, containing hundreds of co-types of Berkeley and Curtis species, as well as portions of Schweinitz specimens, was purchased by Dr. Farlow and is now in the Cryptogamic herbarium at Harvard. Dr. Farlow writes:[13]

> "There are [with the Curtis herbarium] lists of several thousand numbers of the things sent to Berkeley with the corresponding numbers of the original collections so that there is no difficulty in recognizing the numbers quoted by Berkeley in Grevillea."

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BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.